Deciduous Forest Interior Birds

Wood Thrush *Hylocichla mustelina*
Eastern Wood Pewee *Contopus virens*
Black-throated Blue Warbler *Dendroica caerulescens*
Worm-eating Warbler *Helmitheros vermivorus*
Scarlet Tanager *Piranga olivacea*

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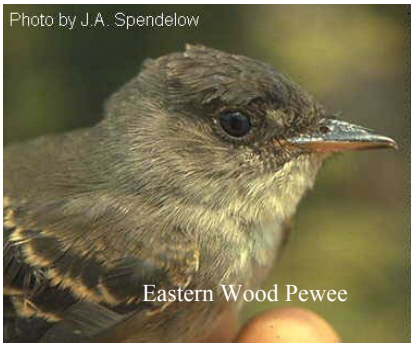
DESCRIPTION

Taxonomy and Basic Description

The species described in this report are in the perching bird order, Passeriformes, and represent four families: Parulidae (warblers), Turdidae (thrushes), Thraupidae (tanagers), and Fluvicolinae (pewees). Currently accepted names for the wood thrush, worm-eating warbler and scarlet tanager are from Gmelin (1789) and the eastern wood pewee was first described by Linnaeus in 1766. Two subspecies have been described for the black-throated blue warbler: *Dendroica caerulescens caerulescens* (Gmelin, 1789), which ranges from Pennsylvania into Canada, and *Dendroica caerulescens cairnsi* (unverified), which ranges from West Virginia south to Georgia (Holmes 1994; ITIS 2004).



Eastern wood pewees are medium sized flycatchers. Both sexes are grayish-olive with white wing bars and a bi-colored mandible; the lower mandible is yellow. Wood pewees are 13.3 cm (5.25 inches) long and weigh 14 g (0.49 ounces) (McCarty 1996).

Basic coloration of the wood thrush is rusty brown with white underparts punctuated by brown spots. A white eye ring is also present. The wood thrush is 17. 8 cm (7 inches) in length and weighs 40 to 50 g (1.4 to1.8 ounces) (Roth et al. 1996).

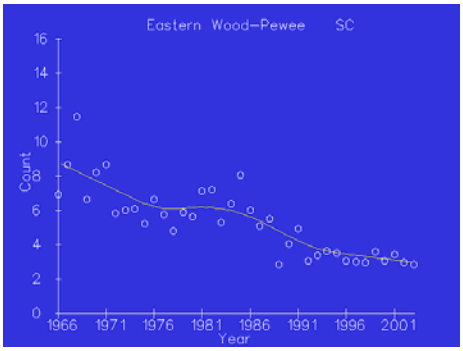
Worm-eating warblers are olive-brown with bold black and buff head stripes. Pink legs are another feature of this species. The worm-eating warbler is 11.4 cm (4.5 inches) in length. The male and female of this species are identical in appearance (Hanners and Patton 1998).

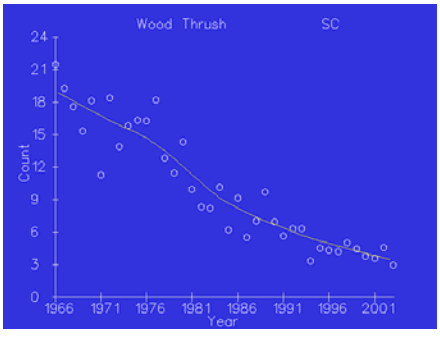
In the black-throated blue warbler and scarlet tanager, the sexes differ greatly. In fact, the female black-throated blue warbler was once mistaken for a separate species, the "pine swamp warbler" by Audubon in 1841. The male black-throated blue warbler has a black face and dark blue crown and back. The female is yellowish-white above with gray on the cheek. A white wing patch is visible on both sexes. Black-throated blue warblers measure 11.4 cm (4.5 inches) in length and weigh 9 to 10 grams (0.32 to 0.35 ounces) (Holmes 1994).

Scarlet tanager males take on scarlet red body plumage with black wings and tail in the breeding season. Females are olive colored above and yellow underneath with gray wings and tail. This species is 16.5 cm (6.5 inches) long (Mowbray 1999).

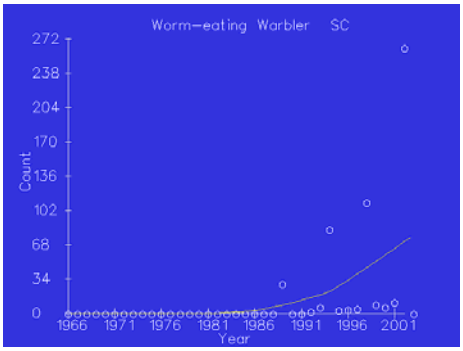
Status

All species in this group are Neotropical migrants of regional importance (Rosenberg 2004) and are considered priority species because of trends showing present population declines or potential declines in the near future due to threats to their habitat.

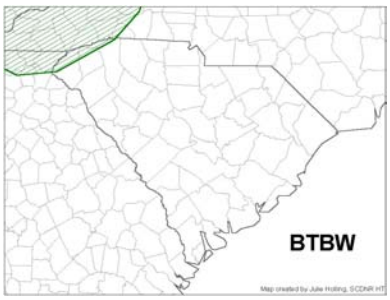




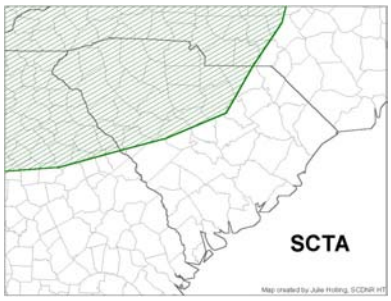
The Breeding Bird Survey (BBS) indicates a 3.4 percent rate of decline per year for the eastern wood pewee in South Carolina while the wood thrush has undergone more drastic reductions in its population at 5.0 percent per year (Cely 2003). The worm-eating warbler has gained a slight increase in population numbers in South Carolina in recent years, possibly due to a range expansion into the inner and outer coastal plains (Cely 2003). Scarlet tanager and black-throated blue warbler populations in South Carolina appear to be stable; however, these peripheral species have not been studied in depth in the southern Appalachians of South Carolina (Huckabee 2001).



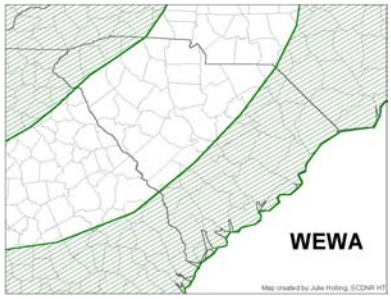
POPULATION DISTRIBUTION AND SIZE



The black-throated blue warbler and scarlet tanager range into the Southern Appalachian Ecoregion. However, the scarlet tanager may be experiencing a range expansion into the Piedmont Ecoregion (Cely 2003; Mowbray 1999).



The eastern wood pewee, worm-eating warbler and wood thrush are found in the Southern Appalachians, but often range into the piedmont. The eastern wood pewee can be found statewide, although the densest populations are in upstate areas.



The worm-eating warbler does occur in the eastern portion of the coastal plain (inner and outer) while the wood thrush, another coastal plain inhabitant, is less common in the outer coastal plain.

Population size estimates and goals derived by Rosenberg (2004) from the Partner's In Flight North American Landbird Conservation Plan are outlined below.

Population estimates for species in South Carolina (Rosenberg 2004).

Species	**SC Population Estimate***	**Target Population Estimate***
Wood Thrush	360,000	540,000
Eastern Wood-Pewee	140,000	210,000
Black-throated Blue Warbler	N/A	N/A
Worm-eating Warbler	6400	6400
Scarlet Tanager	2800	2800

* In individual numbers of birds

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

Since forest birds tend to cue in on forest age, size and overall structure more than plant composition (Hanners and Patton 1998; Rosenberg et al. 2003), these birds appear to prefer blocks of deciduous forest (Rosenberg et al. 1999). These birds benefit most from landscapes that are 50 to 70 percent forested (Rosenberg et al. 1999) with patches no less than 80 ha (200 acres). Blocks that are 3,000 ha (7,500 acres) in size provide the greatest benefits to all of these forest bird species, especially since some require larger territories as habitat quality changes

(Rosenberg et al. 1999; Rosenberg et al. 2003). The shape of the management blocks should be circular to minimize edge effects, which can extend 45 to 90 m (150 to 300 feet) into the forest interior (Rosenberg et al. 2003).

The forest cover type these species of birds utilize is "deciduous forest," characterized by Northern red oak (*Quercus rubra*), chestnut oak (*Q. prinus*), hickory (*Carya* spp.), red maple (*Acer rubrum*) and a variable shrub layer (depending on soil moisture conditions and elevation). This cover type is comparable to the "Appalachian oak" (Hunter et al. 1999) and "Oak-hickory" (Hamel 1992) complexes. These forests often grade into "coves," which are characterized by the addition of such species as eastern hemlock (*Tsuga canadensis)*, yellow poplar (*Liriodendron tulipifera*), and an understory of rhododendron (*Rhododendron* spp.) (Hamel 1992; Hunter et al. 1999). The wood thrush and eastern wood pewee can also be found in mixed pine-hardwood forests and in edge habitats. The wood thrush may even move from interior to second-growth woodlands after the breeding season and before migration (Roth et al. 1996). The wood thrush often uses small deciduous forest corridors on the coast (Forsyth pers. comm.).

All of the bird species in this grouping share the same basic habitat requirements such as forest interior (greater than 70 percent cover) (Hunter et al. 1999), a partially to completely closed canopy and patch sizes of at least 80 ha (200 acres) due to area sensitivity (Rosenberg et al. 2003). The exception is the eastern wood pewee, which can tolerate smaller woodlots and an open canopy. However, as with most species in this group, nesting success declines in such areas. All members of this group require some understory cover, but certain species, such as black-throated blue warblers, require a higher density of shrubs (viburnums) for nesting. Natural disturbances throughout a forest often creates vertical and horizontal vegetative structure. Those typical of the canopy are the scarlet tanager and eastern wood pewee. Understory and ground users are the worm-eating warbler, wood thrush and black-throated blue warbler. All five of these species typically require breeding territories of approximately 5 ha (12.3 acres) about 250 m (820 feet) in diameter (NatureServe 2004).

Other species that may benefit from the maintenance of deciduous forests of this age and structure include, but are not limited to, the following: hooded warbler (*Wilsonia citrina*), ovenbird (*Seiurus aurocapilla*), black-throated green warbler (*Dendroica virens*), red-eyed vireo (*Viero olivaceus*), black-and-white warbler (*Mniotilta varia*), Louisiana waterthrush (*Seiurus motacilla*) and Kentucky warbler (*Oporornis formosus*) (Rosenberg et al. 1999; Huckabee 2001).

CHALLENGES

Forest fragmentation is the biggest problem for deciduous forest interior birds. Roads into forests bring native and non-native predators such as rodents and feral cats. Nest parasites, such as the brown-headed cowbird (*Molothrus ater*) can also move into the forest interior. As forest habitat shrinks, bird species that are area-sensitive may abandon smaller woodlots altogether.

Communication towers are a significant source of mortality for migratory birds. Nocturnal migrants often become confused by the red lights of communication towers and hit the guy wires or the towers themselves. In a report by the American Bird Conservancy (Shire et al. 2000), the

number one species killed was the Ovenbird, followed closely by the species comprising this deciduous forest group.

Additionally, an over-population of white-tailed deer can be detrimental to bird habitat. In areas of high densities (greater than 7.9 deer/km^2), herbivores browse the understory such that nesting and foraging substrates are greatly reduced (NatureServe 2004).

Although not a problem specific to South Carolina, habitat destruction on the birds' wintering grounds (Central and South America and the Caribbean) is causing a decline in populations. For example, the black-throated blue warbler exhibits site tenacity at wintering grounds. This factor makes it vulnerable to changes in that habitat (Holmes 1994).

Introduced diseases that affect the birds' habitat can be detrimental. Sudden oak death (*Phytophthora ramorum*) is a fungus that has entered South Carolina and other southeastern states via nursery stock. It affects red oaks, black oak and Northern pin oak. Although not an immediate problem at this time, the disease, if not contained, has the potential to decimate the deciduous forests of South Carolina, not unlike the chestnut blight (*Cryphonectria parasitica)* in the earlier part of this century. In addition to introduced diseases, there are exotic insect outbreaks of concern. Because the black-throated blue warbler also utilizes coves where hemlocks are a major canopy species, the hemlock woolly adelgid (*Adelges tsugae* Annand) may impact the bird's habitat.

Although not as common in the mountains of South Carolina, continued acidic precipitation may lead to the leaching of calcium from the soil. This is a major requirement of snails, earthworms (*Sparganophilus pearsei*) and pillbugs (*Isopoda* spp.), which are all food for leaf litter foraging worm-eating warblers and wood thrushes. Finally, it has been suggested that precipitation changes as a result of global warming may impact the habitat of the black-throated blue warbler (Holmes 1994).

CONSERVATION ACCOMPLISHMENTS

Purchase and protection of the Jocassee Gorges in 1997 resulted in habitat protection for these species. The Jocassee Gorges includes at least 1,200 acres of forest 60 years and older; some patches are older than 80 years (M. Hall, SCDNR, pers. comm.). Most, however, is still maturing. Completion of PIF plans for Physiographic Area #03: South Atlantic Coastal Plain and Physiographic Area #23: Southern Blue Ridge serve as good sources of continued management interaction. Finally, preliminary (Huckabee 2001) and continued (Boyle et al. 2003) research on forest interior species in the Jocassee Gorges and surrounds have provided and will continue to provide important information for these species.

CONSERVATION RECOMMENDATIONS

- Identify and protect forest interior and unbroken large tracts of deciduous forest habitat. Determine the best sites for conservation and/or restoration projects by conducting a landscape level spatial analysis and utilize GIS based models as a basis for land

acquisition and delivery of private lands programs in order to locate areas where opportunities for conservation are the greatest.

- Maintain migratory stopover habitat in coastal areas and river bottoms for wood thrush, worm-eating warbler and other Neotropical migrants.
- Develop corridors to link forested tracts.
- Continue to promote partnerships to implement forest health measures to prevent, detect and suppress outbreaks of SOD and hemlock woolly adelgid on public and private lands.
- If disturbances are unavoidable, they should be concentrated near edges. Although some tracts should be allowed to return to old-growth forest, other areas can be selectively thinned to mimic natural disturbances.
- Private landowners should be encouraged to protect contiguous tracts of high-quality deciduous forest. In addition, the consolidation of land ownership to expand existing forests already under protection should be continued.
- Reduce communication tower collisions. The following recommendations set forth by Shire (2000) may assist in that effort:
    - No aviation lights should be placed on towers that are less than 199 ft. tall.
    - Remove old towers that are no longer in operation. Recycle old communication towers for additional purposes instead of building new ones.
    - Environmental Assessments should be conducted to determine the impact a new tower's construction will have on birds if built in a migratory route.
- If found to be causing an impact in certain areas, the removal of feral cats (*Felis catus*) from public lands through live trapping should be implemented.
- Conduct studies to determine the minimum area requirements for forest birds.
- Investigate coastal nesting and general habitat use in the coastal plain for worm-eating warblers.
- Initiate site fidelity and dispersal studies for the scarlet tanager.
- Investigate the effects of deer on breeding bird habitat.
- Develop and implement monitoring programs to better assess breeding, migrating and wintering bird population sizes. Management and surveillance monitoring techniques will need to be assessed to quantify short and long-term population responses in order to answer specific monitoring questions. Measures will need to be developed to integrate state monitoring results into regional and national level databases.
- Breeding Bird Survey routes should continue annually; increase the number of routes in under-sampled areas of South Carolina.
- Radar ornithology should be continued in order to monitor bird-habitat associations at migration stopover sites.
- The public should be educated on the plight of Neotropical migrants and those species that specifically utilize deciduous forest interiors. Interpretive trails can be created within Jocassee, possibly utilizing the existing Foothills Trail.
- Partner with other states and countries to gather data on migratory stop-over sites, wintering ground usage and the threats faced at each.
- Continue participation in the Atlantic Coast Joint Venture at the management board and science committee levels. Promote the development of a piedmont bird conservation region initiative.
- Continue participation in Partner's In Flight, NABCI and other bird initiatives.

- Promote existing and develop new partnerships to facilitate increased land acquisition.
- Promote the participation of volunteers and agency personnel to collect survey and monitoring data.

MEASURES OF SUCCESS

Habitat improvement and restoration projects should result in higher BBS survey counts and nesting success rates. One obvious measure of success is to support population sizes similar to the goals outlined here (Rosenberg 2004).

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